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TITLE

Huffman coding and decoding.

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FIELD OF THE INVENTION

Embodiments of the present invention relate to Huffman encoding and decoding. In particular they relate to improved mechanisms for encoding and decoding and an improved representation of a Huffman tree.

BACKGROUND TO THE INVENTION

In digital processing, if a message comprises a sequence of symbols, each distinct symbol can be represented as a distinct binary codeword. Huffman's algorithm uses a table of the frequencies of occurrence of each symbol in a message and optimizes the variable length codewords such that the most frequent codeword has the shortest length. This results in data compression and Huffman coding is commonly used in audio and video compression coding, for example, MPEG.

"A method for the construction of minimum-redundancy codes", by David A Huffman, Proceedings of the IRE 40 (1952) 1098-1101, introduces Huffman Coding.

If there are nine symbols S0, S1 ...S8 with the following respective frequencies of occurrence 5, 5, 6, 1, 2, 3, 16, 9, 9, then they can be encoded using the Huffman algorithm into the binary tree illustrated in Fig. 1.

The tree 10 comprises leaf nodes Si and interior nodes FI arranged in H levels. Each leaf node depends from a single interior node on the next lowest level and represents a symbol. Each interior node depends from a single interior node on the next lowest level. The level L of a node is defined by setting the root to level 0, and the other nodes have a level that is one higher that the level of the node from which it depends. The highest level is the height H of the Huffman tree. The symbols (i.e. the leaves of T) are labelled from left to right as S0, S1, S2 ...S8.

The Huffman tree illustrated in Fig. 1 results in the following coding of the symbols